

SUPPORT FOR THE AMENDMENTS

Claims 1, 2, 4, 5 and 13 are herein canceled. Applicants make no statement with respect to the propriety of the grounds for rejection of these claims and preserve the right to present these claims in a continuation application without prejudice.

Support for the amendment of Claim 6 is found in Claim 13.

Claim 8 is amended to use wording and structure consistent with U.S. patent law practice.

Claims 16-19 are new and are supported by Claim 6.

No new matter is added to this application by this request for reconsideration.

Claims 1, 2, 5-9 and 11-19 are active.

REMARKS/ARGUMENTS

The presently claimed invention is directed to an asymmetric anthracene derivative as described in Claim 6 and an organic electroluminescence device which comprises a cathode, an anode and a light emitting layer disposed between the cathode and anode which comprises the anthracene derivative.

Applicants wish to thank Examiner Crouse for the useful and courteous discussion of this application with Applicants' representatives on February 17, 2009. At that time the significance of the specific structures described in Claim 6 and the improvement in efficiency of light emission obtained with electroluminescent devices containing these compounds in the emissive layer was reviewed. The asymmetry of the claimed structures was noted and contrasted to structures disclosed in the cited references. The following reiterates and expands upon that discussion.

Applicants respectfully note that Claims 1, 2, 4, 5 and 13 are herein canceled and Claim 6 is amended to recite that X in formula (2) is hydrogen or an aromatic group having 6 to 50 nuclear carbon atoms .

The rejection of Claims 6, 7, 14 and 15 under 35 U.S.C. 102(b) or in the alternative, under 35 U.S.C. 103(a) over Shi et al. (EP 1,009,044) is respectfully traversed.

The Office has cited formulae (I), (VI), (VII), (X) and (XI) from Shi, to show anthracene derivatives according to Claim 6 of the present invention. Applicants respectfully maintain that Shi describes these materials only as **hole transport components** and nowhere does the reference disclose or suggest an organic electroluminescence device wherein the anthracene materials of formulae (I), (VI), (VII), (X) and (XI) are components of an emissive layer or that these materials can be used for such purpose.

Furthermore, Applicants have shown that the 9,10 **asymmetric** di-substituted anthracene compounds according to the claimed invention have significantly improved operational half lives as emissive materials in an EL device in comparison to symmetric di-substituted anthracene compounds. The data for Examples 5, 6, 7, 8, 14 and 15 according to the claimed invention and Comparative Examples 1 and 2 is shown in the following Table.

Table

Example No.	Structure	Efficiency (cd/A)	Half life (hours)
5	AN 8	11.2	4200
6	AN 10	11.0	4,000
7	AN 28	10.9	3,700
8	AN 30	10.8	3,700
9	AN 8	10.6	3,200
14	AN 7	11.3	4,500
15	AN 49	11.3	4,500
Comp. 1	an 1	9.0	2,200
Comp. 2	An 2	8.8	1,100

As indicated by the examples in the Table, the asymmetric compounds according to the claimed invention show 20% or better improvement in emission efficiency when compared to the symmetric compounds of the comparative examples. Applicants respectfully submit that one of ordinary skill in the art recognizes such improvement as significant in comparison to conventional light emitting compounds.

Applicants note that Shi formulae X and XI are broadly described asymmetric structures which constitute a genus of which compounds of formula (2) of the claimed invention are a subgroup. Applicants note that in both formulae, R<sup>1-4</sup> are “hydrogen, alkyl of 1 to 24 carbon atoms; aryl or substituted aryl of from 5 to 20 carbon atoms; or heteroaryl or substituted heteroaryl of from 5 to 24 carbon atoms; or fluorine, chlorine, bromine; or cyano group.” [0011]

In contrast, the claimed compounds as presently described in Claim 6 are anthracene derivatives where the central anthracene ring is substituted only in the 9, 10 positions and the

Ar and Ar' are aromatic groups of carbon composition and not the broad range of structures described by Shi which includes all the possibilities and permutations presented by the defined possible range of structures for R<sup>1-4</sup>.

Applicants respectfully point out that Shi does not disclose any specific compounds according formulae X and XI and, in addition, no preferred description narrowing these formulae is provided.

Applicants respectfully direct the Office's attention to *In re Petering*, 301 F.2d 676, 133 USPQ 275 (CCPA 1962) which states:

"The generic formula of Karrer, . . . , encompasses a vast number and perhaps even an infinite number of compounds since there is no express limit on the size of the alkyl group or the structure and size of R. Even though appellants' claimed compounds are encompassed by this broad generic disclosure, we do not think this disclosure by itself describes appellants' invention, as defined by them in any of the appealed claims, within the meaning of 35 U.S.C. 102(b)."

Applicants have stated the following on page 3, lines 14-20, in the specification:

"As a result of intensive studies by the present inventors to achieve the above object, it was found that an EL device exhibiting a great efficiency of light emission and has a long life could be obtained when a compound having **an anthracene structure having a specific asymmetric structure** represented by general formula (1) or (2) shown below is used as the light emitting material of an organic EL device." (Bold added)

Applicants respectfully submit that structural formulae as indicated and defined by Shi '044 describes an almost limitless range of symmetric and asymmetric compounds, **with no disclosure or suggestion of an asymmetric structure** being preferred, and therefore, in accordance with *In re Petering* the Shi formulae X and XI cannot anticipate the claimed invention.

Compounds 47, 48, 50, 51, 52, 54, 55, 56 and 57 of Shi have been cited. Applicants respectfully submit that these compounds all have two substituents symmetrically placed on a

phenyl ring which does not meet the description of Ar' according to the presently claimed invention.

In view of all the above, Applicants respectfully submit that the cited reference cannot anticipate or render obvious the claimed invention and withdrawal of the rejection of Claims 6, 7, 14 and 15 under 35 U.S.C. 102(b) or in the alternative, under 35 U.S.C. 103(a) over Shi et al. (EP 1,009,044) is respectfully requested.

The rejection of Claims 1, 2, 4, 6-9, 11 and 13-15 under 35 U.S.C. 103(a) over Shi et al. (U.S. 5,935,721)(Shi '721), in view of Shi et al. (U.S. 5,972,247)(Shi '247) is respectfully traversed.

Applicants respectfully note that both Shi ('721) and Shi ('247) describe anthracene compounds with **symmetric** 9,10 substitution.

Shi '247 describes (Col. 2, lines 60-67):

In 9,10-bis(3'5'-diaryl)phenyl anthracene molecule, it would exist a series of non-interconverting atropisomers due to the existence of the two phenyl-anthracene and four phenyl-aryl groups which have large energy barriers to internal rotation. It suggests the presence of polymeric forms in solid form among this class of compounds. As a result, the film forming property of 9,10-bis(3',5'-diaryl)phenyl anthracene is very good.

Accordingly, Applicants respectfully submit that Shi '247 teaches the need of the symmetric structure as this reference and Shi '721 claim.

Moreover, neither reference discloses or suggests a structure according to Claim 6, wherein only one aromatic substituent is present on the phenyl ring.

The Office has alleged that it "would have been obvious to one of ordinary skill in the art based on substituted dinaphthyl anthracene (N-A-N) derivatives used as blue emissive materials for the light emitting layer of an electroluminescent device and substituted diphenyl anthracene (P-A-P) derivatives [[of]] used a[s] blue emissive materials for the light emitting layer of an electroluminescent device that the replacement of one of the naphthyl

groups of Shi '721 with a substituted phenyl group of Shi '247 would result in a 9,10-disubstituted anthracene compound (N-A-P) that would also have similar fluorescent properties as emissive materials for the light emitting layer of an electroluminescent device."

However, Applicants respectfully submit that the combination of Shi '247 and Shi '721 would not result in the structure according to Claim 6 of the present invention. Neither reference discloses or suggests a phenyl ring with a single aromatic substituent as described by the presently claimed invention. Moreover, nowhere does either reference, alone or in combination with the other, provide motivation that would lead one of ordinary skill in the art to the presently claimed invention or that would suggest an improvement in efficiency of light emission as described above. Accordingly, Applicants respectfully request withdrawal of the rejection of Claims 1, 2, 4, 6-9, 11 and 13-15 under 35 U.S.C. 103(a) over Shi '721, in view of Shi '247.

The rejection of Claims 1, 2, 4, 8, 9, 11 and 13 under 35 U.S.C. 103(a) over Shi (EP 1,009,044) in view of Shi ('721) and Shi ('247) is respectfully traversed.

Applicants have described the deficiencies of the primary reference and the combination of secondary references above. Moreover, Applicants respectfully submit that according to the description of Shi '247 provided above, one of ordinary skill in the art at the time of invention, would not have been motivated by any disclosure of the cited references to derive the presently claimed asymmetric structures. Applicants respectfully submit that Shi '247 actually teaches away from asymmetric structure.

In view of the above, Applicants respectfully submit that the cited combination of references cannot render the claimed invention obvious and withdrawal of the rejection of Claims 1, 2, 4, 8, 9, 11 and 13 under 35 U.S.C. 103(a) over Shi (EP 1,009,044) in view of Shi ('721) and Shi ('247) is respectfully requested.

The rejection of Claims 5 and 12 under 35 U.S.C. 103(a) over Shi (EP 1,009,044) in view of Shi ('721) and Shi ('247) and further in view of Ikeda et al. (JP 2001-097897) and over Shi ('721) in view of Shi ('247) and further in view of Ikeda et al. is respectfully traversed.

Claim 5 is herein canceled and Claim 12 depends indirectly from Claim 6. The deficiency of each of the cited combinations with respect to Claim 6 and claims dependent thereon has been described. Ikeda is cited to show use of a styryl amine in an EL device. However, Applicants respectfully submit that the Ikeda does not disclose or suggest an asymmetric anthracene derivative according to the presently claimed invention as a light emitting material and therefore, the cited reference cannot cure the deficiencies described above for the primary combinations of references.

Accordingly, in view of the above discussion, Applicants respectfully submit that the combination of the cited references cannot render the claimed invention obvious. Accordingly, withdrawal of the rejection of Claims 5 and 12 under 35 U.S.C. 103(a) over Shi (EP 1,009,044) in view of Shi ('721) and Shi ('247) and further in view of Ikeda et al. and over Shi ('721) in view of Shi ('247) and further in view of Ikeda et al. is respectfully requested.

Applicants again respectfully request that the provisional rejection of Claims 1, 2, 4-9 and 11-15 on the ground of nonstatutory obviousness-type double patenting over copending Application No. 11/282,818, be held in abeyance pending identification of allowable subject matter. Applicants respectfully note that the above-identified application has an effective filing date of August 18, 2003, which is earlier than the effective filing date of May 19, 2005 of Application No. 11/282,818. (MPEP § 804 I.B.1.)

Application No. 10/524,825  
Reply to Office Action of September 29, 2008

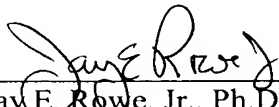
Applicants respectfully submit that the above-identified application is now in  
condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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